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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Updraft and downdraft characterization with Doppler lidar: cloud-free versus cumuli-topped mixed-layer" *by* A. Ansmann et al.

Anonymous Referee #2

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Review : Updraft and downdraft characterization with Doppler lidar: cloud-free versus cumuli-topped mixed-layer

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Overview The authors present a study of boundary layer dynamics for clear and cloud topped conditions. The observations where made using a Doppler lidar and aerosol lidar to determine mixed layer depth and turbulence profiles. The updraft and downdraft statistics presented show good agreement with theoretical projections.

General 1) It would be good to see an analysis of the random component of the velocity time series as a function of signal strength (SNR). This would provide an estimate of

the measurement uncertainty that could be compared to and combined with the various uncertainties discussed in the paper and could be included in the analysis (using the SNR to apportion the error) as opposed to using the same uncertainty for all of the observations regardless of signal strength (fig2). 2) The data shown in Figs 1 & 11 use contours to show the spatial extent of the clouds – how are the tops of the clouds determined and what technique is used to ensure it is not due to attenuation? The lidar data show some evidence of pulse chirp contamination associated with the strong gradients at the cloud's edge in these same regions (Fig 1, panel 2, around 18:00 and panel 3 above the top line of the contour). Have the authors determined that there is no systematic shift in the lidar velocities associated with strong gradients in the backscatter? If it exists and is uncompensated – this effect could contaminate the analysis.

Detailed comments: Line # / Comment Pg 9220 line 13 : "1.3-1.5 larger" Clarify – spatial scale vs strength Pg 9223 line 15 : see comments above on error analysis Pg 9226 line 25 / Fig2 : break out (or show independently) instrument/measurement noise contribution of error as a function of SNR Pg 9230 line 17 : updrat

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 9219, 2010.